

Name: \_\_\_\_\_

## Direct Variation – Circumference Experiment

The circumference of any circle varies directly as the diameter varies.

Mathematically this implies the following formula of variation → \_\_\_\_\_

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### Part One – Obtain a Circle from Sketchpad

Directions: On the sketchpad document, click the point that says “[Drag Here to Resize](#)”. Resize the circle so that the diameter is greater than 1 inch but less than 5 inches. Go to *File* → *Print Preview*. Verify that your circle fits all on one page. If it does not appear on one page, click the *Fit to Page* button. Print your circle and cut it out with a pair of scissors.

### Part Two – Recording your Diameter and your Circumference

Directions: The diameter of your circle should be labeled on your printout. Measure the circumference of the circle using the “String Method”

Diameter in Inches \_\_\_\_\_ Circumference in Inches \_\_\_\_\_

### Part Three – Determining the Constant and Equation of Variation

Directions: Use your knowledge of direct variation and the measurements from Part Two to determine the constant of variation for this scenario. Then write the equation of variation.

Constant of Variation \_\_\_\_\_ Equation of Variation \_\_\_\_\_

### Part Four – Graphing Your Data

Directions: On a large sheet of graph paper use a straight edge to create large xy axes. (You will only need quadrant 1 to make your graph.)

Use the following constraints when making your axes.

- The \_\_\_\_\_ axis is circumference. The \_\_\_\_\_ axis is diameter.
- When scaling the x-axis you should count every grid as being worth 1.
- When scaling the y-axis, you should count every two grids as being worth 1.

Do the following:

1. Create an ordered pair using the measurements that you created in part two.
2. Graph and label the ordered pair.
3. Graph and label (0,0)
4. Using a straight edge draw a ray with an endpoint at (0,0) that goes through the point you created from your measurements.

### **Part Five – Using the Graph and Equation to Make Predictions**

Directions: Please answer the following.

1. Look at your graph. Use it to estimate the circumference of a circle that has a diameter of 2.25 inches? (Place a little x at the appropriate point on your graph to show where you read this point of data from)
2. Look at your graph. Use it to estimate the diameter of a circle with a circumference of 20 inches? (Place a little square at the appropriate point on your graph to show where you read this data from.)
3. Refer back to the equation of variation you constructed in Part Three. Use the equation to compute circumference of a circle that has a diameter of 2.25 inches.
4. Again using your equation, compute the diameter of a circle with a circumference of 20 inches.
5. Compare your answers from questions 1 & 3 above.
6. Compare your answers from questions 2 & 4 above.

## Part Six – Check Your Answers by Doing

In Part Five, you determined the circumference of a circle with a diameter of 2.25 inches. Go back to the SMART Board and drag the resize button so that the diameter becomes 2.25 inches. Click the *Show* button to see the actual circumference. Describe how well you did with your calculation in Part Five. Try to explain any reason why your answer might be off.

Similarly in Part Five, you computed the diameter for a circle with a circumference of 20 inches. Go back to the SMART Board and drag the resize button so that the circumference is 20 inches. Note the actual diameter of the circle. Describe how well you did with your computation in Part Five. Try to explain any reason why your answer might be off.